

Dependence of past air pollution on meteorology over Europe

Camilla Andersson^{1,2}, Joakim Langner² and Robert Bergström²

¹Department of Applied Environmental Research, Stockholm University,
Frescativ. 54a, SE-10691 Stockholm, Sweden

²Swedish Meteorological and Hydrological Institute,
Folkborgsv. 1, SE-60176 Norrköping, Sweden
e-mail address: camilla.andersson@smhi.se,
fax no: +46 11 4958001; phone no: +46 11 4958203

Ozone and particulate matter are two of the most important pollutants in Europe today. Ozone and PM both affect human health. Ozone also affects materials and ecosystems. The same is true for the acidifying and eutrophying deposition of nitrogen. Hence there are costs for society related to these pollutants.

Changes to future air pollution will be brought on by changes in emissions, climate and long-range transport. In this study we have investigated the effect of past climate change and variability, which can affect the concentration and deposition over Europe, both through changes in natural emissions, through land use change (not considered here) and shortly stated change in chemistry due to differences in e.g. water content, precipitation amount and pattern, cloudiness and wind direction and magnitude. The issue is complex and non-linearities with regard to meteorology and emissions are expected, hence the use of chemistry transport models (CTMs) in this type of study is necessary.

In this study we use the ECMWF reanalysis meteorology (ERA40) to simulate past and present (1958-2001). Only the meteorology is varied; long-range transport into the model domain and emissions (excepting natural VOC emissions) are held constant for all simulations.

Inter-annual variability and trends in air pollution concentration and deposition will be presented and compared to the corresponding for meteorological parameters. The variability will also be compared to observed trends (affected by emission regulation). The work has been published recently in two papers (Andersson et al., 2007; Andersson and Langner, 2007).

The CTM used in the study is the regional scale MATCH model which has been extensively evaluated on European scale and compared well with both observations and a range of other European CTMs.

In more local studies the model also display good agreement with observations. The work was partly funded by the European commission (<http://nepap.ivl.se>).

References

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